UNIVERSITI TEKNOLOGI MARA
Institut Pengajian Siswazah

THE DOCTORAL RESEARCH ABSTRACTS

Volume: 14, October 2018

14th ISSUE

IGS Biannual Publication

Name : NURUL AIN BINTI MOHD ZAKI

Title : QUANTIFICATION OF TROPICAL RAINFOREST BIOMASS AND CARBON STOCKS USING AIRBORNE LiDAR AND WORLDVIEW-3 IMAGE

Supervisor : ASSOC. PROF. SR. DR. ZULKIFLEE ABD LATIF **(MS)**
PROF. DR. MOHD NAZIP SURATMAN **(CS)**

The forest plays an undeniably pivotal role as a carbon sink, which absorbs carbon dioxide from the atmosphere. Light Detection and Ranging (LiDAR) a relatively latest in active remote sensing which can provide the appraisal of three dimensional of the horizontal and vertical structure with an accurate structure. The availability of the LiDAR and WorldView-3 imagery is a good combination in order to model the forest structure and above-ground biomass (AGB) and carbon stock quantification of the complex diversity of tropical rainforest structure. This research aims to develop allometric equation for above-ground live tree biomass by combining field-based, a combination of field data observation and technology (WorldView-3 and LiDAR) and by using only technology derivation only. Therefore, the objectives are to investigate the factors that affect the tropical rainforest and AGB estimation using biophysical field data collection, to formulate a model AGB determine from crown projection area (CPA) model using Object Based Image Analysis (OBIA) Imagery with LiDAR data and to apply the forest biomass and carbon stock estimation model derived from relationship of WorldView-3, LIDAR and forest mapping. The independent predictor was induced based on the literature review and theories, and an ordinary least squares (OLS) estimator will be used to develop multiple regression models (MLR). During model selection, the best model fits selected by calculating statistical parameters such as residual R2 selection methods, adjusted coefficient of determination, Root Mean Square Error (RMSE), graphical analysis of the residuals, standard error (Syx) and Akaike information criterion (AIC). The novelty of this research lies in the establishment of the aboveground carbon stocks model and prediction based on extensive statistical approach and algorithm. Three model had been develop which is Model 1 (R2=0.952), Model 3 (R2 = 0.951) and Model 5 (R2 = 0.730). The results show that the amount of AGB in the study area was estimated to be 134.874 t ha-1 (Model 1), 139.881 t ha-1 (Model 3) and 179.516 t ha-1 (Model 5). The research findings are the complement to the Guidelines for National Greenhouse Gas Inventories for Agriculture, Forestry and other Land use under Intergovernmental Panel on Climate Change (IPCC) which set the baseline for AGB of the tropical rainforest in Asia (continental) about 120 – 680 t ha-1.